REMARKS

Pursuant to 37 C.F.R. §1.111, reconsideration of the instant application, as amended herewith, is respectfully requested. Entry of the amendment is requested.

Claims 9 and 13-16 are presently pending before the Office. Claims 1-8 were previously canceled and claims 10-12 are canceled herein. Applicants have amended the claims. No new matter has been added. Support for the amendments can be found throughout the specification as originally filed. Applicants are not intending in any manner to narrow the scope of the originally filed claims.

The Examiner's Action mailed April 23, 2003 (Paper No. 7) and the references cited therein have been carefully studied by Applicants and the undersigned counsel. The amendments appearing herein and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is believed to be in condition for allowance.

The amendment of claim 9 is based on adding content of previously added claims 10 to 12 into the claim 9. Further, the claim 9 is amended based on the original specification at page 1, lines 10-16 in the section "1. Field of the invention".

Relying on 35 U.S.C. §103(a), the Examiner has rejected the subject matter of claims 9-16 as obvious over Romberger ('833 patent), in view of the '431 patent to Payne, Akira, JP 61209909 and Derwent Abstract 1986-287846. Applicants respectfully traverse the rejection and request reconsideration.

(1) The colloidal silica slurry, which relates to the present invention, is the colloidal silica slurry which is comprised by adding hydrogen peroxide 5 ~ 100 ppm to lowered metal silica slurry, which metal content is 1 ppm or less and produced from silicate ester, and the pH of colloidal silica slurry is 6.0 ~ 8.0 and content of colloidal silica is 0.05 ~ 50 weight %.

(2) In the US 5,230,833 (Romberger et al), lowered metal silica slurry used in polishing silicon wafers is described. Further, the reference describes that lowered metal silica can be produced from silicate ester.

In the section "BACKGROUND OF THE INVENTION", it is described as "in the US Patent No. 3,860,431, hydrogen peroxide is used as biocide". In lines 59 to 65, column 15, it is described as "Al, present in an amount less than about 100 ppm, based on SiO2; iron, as Fe, present in an amount less than about 50 ppm, based on SiO2; potassium, as K, present in an amount less than about 25 ppm, based on SiO2; and sodium, as Na, present in an amount less than about 500 ppm, based on SiO2".

In the US 3,860,431 (Payne et al), an invention which relates to slip resistant composition for paper coating is described. As disclosed in lines 50 ~ 58 of the fourth column, hydrogen peroxide is shown as a kind of biocide. In lines 64 to 66 of column 4, the composition quantity of biocide is described as 0 ~ 0.5% and preferably 0.3 ~ 0.5 %.

(3) In this Office Action, the Examiner stated: "It would have been obvious to one of ordinary skilled in the art the time of applicants invention to employ the minimum pH required in

the polishing composition of Romberger et al for the advantage of reducing washing steps to remove excess alkaline materials in post processing. The pH values are sufficiently close (8.0 to 8.5) that a determination of the minimum pH for the Romberger et al. composition would have been an obvious variation of pH disclosed in the Romberger et al reference."

Although pH values prepared in the present invention and the US 5,230,833 are close, in the invention of US 5,230,833, it is not easy to employ pH value 6.0 ~ 8.0.

(4) In US 5,230,833, it is described that "pH, as prepared with ammonia, ranging from between about 8.5-11.3" (line 34 to 35, column 8), and pH value is clearly described as pH 8.5 . 11.3. From this description, in the invention of the US 5,230,833, the colloidal silica slurry cannot be set less than pH 8.5.

In the US 3,860,431, the colloidal silica slurry is described as pH 8.6 ~ 10.0, so the colloidal silica slurry cannot be set less than pH 8.6. Further, in the invention of the US 3,860,431, even for one skilled in the art, selecting hydrogen peroxide as the biocidal additive is not easy. In alkaline colloidal silica slurry, such as described in the US 3,860,431, even if hydrogen peroxide is added, it decomposes and does not work as a biocidal additive. By testing, one skilled in the art can easily understand that in the invention of the US 3,860,431, in four biocidal additives, hydrogen peroxide cannot be used in practice.

(5) Moreover, in US 5,230,833, the content of metal impurity is described. The content of four types of metal impurities described in claim 1 is less than 675 ppm, but the content of metal impurity of the present invention is prepared as 1 ppm or less. There is a big difference in these contents. In the present invention, the content of metal impurity is prepared as 1 ppm or

less, because bad effect to electric properties of semiconductor parts and decomposition of hydrogen peroxide composed as biocidal additive, can be prevented. In the US 3,860,431, there is no clear definition of content of metal impurity.

(6) In line 31 ~ 42, column 2 of US 6,530,967 (Misra), it is described that when hydrogen peroxide is added in conventional colloidal silica slurry, it decomposes. From this description, it is concluded that any method for inhibiting or preventing the decomposition of hydrogen peroxide is required.

That is, in the inventions described in the US 5,230,833 or US 3,860,431, although it is described that hydrogen peroxide can be used as biocidal additive, hydrogen peroxide cannot be used to the colloidal silica slurry described in the US 5,230,833 or US 3,860,431.

When hydrogen peroxide is added to colloidal silica slurry described in the US 5,230,833 or US 3,860,431, it may work as a biocidal additive immediately after adding but cannot work for a long period.

In JP61-209909, a method for producing colloidal silica slurry from silicate ester is described, but the colloidal silica slurry is prepared pH 9.0 ~ 10.0. The colloidal silica slurry is different to colloidal silica slurry of the present invention, which is prepared pH 6.0 ~ 8.0.

Further, in US 5,230,833, a method for producing colloidal silica slurry from silicate ester is described, but preparing metal impurity content 1 ppm or less and preparing pH 6.0 ~ 8.0 are not described, and the colloidal silica slurry is different to the colloidal silica slurry of the present invention, which metal impurity content is prepared 1 ppm or less and pH is prepared pH 6.0 ~ 8.0.

(7) In the present invention, decomposition of hydrogen peroxide can be prevented for a long period by preparing colloidal silica slurry pH 6.0 ~ 8.0 and by preparing content of metal impurity at 1 ppm or less, and this is described in after-mentioned test example. In the test example, an evaluation of decomposition of hydrogen peroxide by preparing of colloidal silica slurry pH 7.4 ~ 9.5 and by adding hydrogen peroxide into said colloidal silica slurry is shown.

In the last declaration, a test example evaluating decomposition of colloidal silica slurry with using commercially available colloidal silica slurry which is pH 9.6 and 9.2 and by adding hydrogen peroxide into the colloidal silica slurry is shown.

Even though the colloidal silica slurry has almost same pH, in a sample (pH 9.5) of after-mentioned test exampe that content of metal impurity is 1 ppm or less, substantive decreasing of hydrogen peroxide decomposition is shown as compared to a sample (pH 9.6 or 9.2) which I submitted last that has over 1 ppm of metal impurity content.

Further, in after-mentioned test example, as pH is increased, an increase of the decomposition of hydrogen peroxide is shown. Therefore, to prevent decomposition of hydrogen peroxide in colloidal silica slurry, pH is needed to be prepared 6.0 ~ 8.0 and content of metal impurity is needed to be prepared 1 ppm or less.

In the inventions of Romberger et al and Payne et al that preparing pH which is over 8.5 is described but preparing pH which is less than 8.5 and preparing content of metal impurity which is 1 ppm or less is not described.

Therefore, even if one skilled in the art, it is not easy to figure out preparing pH 6.0 ~ 8.0 and preparing metal impurity less than 1 ppm.

Further, even if one skilled in the art, it is not easy to figure out to obtain colloidal silica slurry which can prevent decomposition of hydrogen peroxide and have high stability by preparing pH less than 8.0 and preparing content of metal impurity 1 ppm or less. Therefore, the present invention has inventive step.

(8) Recognition with respect to the declaration.

The Examiner states that added concentration of hydrogen peroxide in the declaration is outside of the scope of claims and has pointed the absence of criticality of the concentration range claimed. However, in the test example described in the declaration, the original purpose of the test example was not to test a criticality of concentration range of hydrogen peroxide, but to evaluate decomposition of hydrogen peroxide in colloidal silica slurry, which has a different pH. Therefore, it is clear that although adding concentration of hydrogen peroxide of the embodiment is over 100 ppm, this does not deny the criticality of concentration of hydrogen peroxide.

Further, the samples described in the declaration are different in silica concentration or amount of metal content, but these differences of parameter does not effect to the decomposition of hydrogen peroxide. Even if these differences effect to the decomposition, the effect is low.

Moreover, general (commercially available) alkaline colloidal silica slurry was used as comparative example in the test example described in the declaration, and tested decomposition of hydrogen peroxide when hydrogen peroxide was added in alkaline colloidal silica slurry.

Based on the US 3,860,431 described that hydrogen peroxide can be compounded as biocidal additive, in line 7 ~ 10, third column, it is described that conventional anionic colloidal silica sol is used as colloidal silica sol which is added biocidal additive. In Table 1 of the US 3,860,431, content of silica is 40 ~ 60%. Comparative colloidal silica described in the declaration is also included in said range.

Therefore, comparative colloidal silica described in the declaration is suitable for comparative object for the purpose of evaluating decomposition of hydrogen peroxide. Further, from the description of test example of the declaration, when hydrogen peroxide is added in alkaline colloidal silica, it is concluded that hydrogen peroxide decomposes and alkaline colloidal silica described in the US 3,860,431 cannot be added hydrogen peroxide.

In the experiment described in the declaration, decomposition of hydrogen peroxide occurs in colloidal silica slurry in alkaline zone and decomposition of hydrogen peroxide does not occur in colloidal silica slurry in neutral zone and content of impurity being less than 1 ppm.

Therefore, it is understood that when hydrogen peroxide is added in colloidal silica slurry in alkaline zone and content of impurity being less than 1 ppm described in US 5,230,833 or US 3,860,431, and hydrogen peroxide cannot be used as biocidal additive because decomposition of hydrogen peroxide occurs.

(9) Test examples

I. Object of the Test

To test decomposition of hydrogen peroxide in the colloidal silica which was prepared neutral zone and alkaline zone.

II. Sample

For samples, 100 ppm hydrogen peroxide which concentration is 30% was added to extra high purity colloidal silica (Product name: PL-3, Made by Fuso Chemical Co., Ltd.), and then, pH of the colloidal silica slurry was prepared to 8.0, 8.5 and 9.5 by using ammonia water and potassium hydroxide aqueous liquor.

Physicality value of the extra high purity colloidal silica is listed on table 2. The physicality values are slightly different to physicality values of colloidal silica slurry of test example in the last reasoning and declaration, because a production lot is different.

III. Test method

Above-mentioned samples were preserved at 40 °C, and measured changes of concentration of hydrogen peroxide. A determination method of concentration of hydrogen peroxide was followed by iodometric titration method, which adds potassium iodide to each sample and titrates generating Iodine with sodium thiosulfate solution.

IV. Result

Test result of samples which were preserved under thermal condition 40 °C for 12 days is described in Table 1.

Table 1

(ppm wt/wt)

	pH	Before Test	40 °C After 12 days
Fuso Chemical Co., Ltd.			
PL-3 +H2O2	7.41	81.5	81.4
Add NH3	8.02	81.5	81.2
Add NH3	8.48	81.5	81.1
Add NH3	9.48	81.5	80.0

Add KOH	8.00	81.5	79.6
Add KOH	8.50	81.5	78.1
Add KOH	9.50	81.5	75.9

Table 2

Company		Fuso Chemical Co., Ltd.
Product name		Quartron PL-3
pH		7.5
specific gravity (20/4°C)		1.120
concentration of Silica	(wt%)	19.50
BET specific surface area	(m2/g)	77
primary particle diameter (conversion method using specific surface area)	nm	35.6
metal impurity		
Na	ppm	0.07
K	ppm	0.01 or less
Fe	ppm	0.005 or less
Al	ppm	0.01 or less
Ca	ppm	0.01 or less
Mg	ppm	0.01 or less
Ti	ppm	0.5 or less
Ni	ppm	0.005 or less
Cr	ppm	0.005 or less
Cu	ppm	0.005 or less

As mentioned in Table 1, decomposition of hydrogen peroxide is recognized as increasing pH, and compared to a sample which content of metal impurity is over 1 ppm, a degree of decomposition of hydrogen peroxide decreases drastically.

Therefore, to use hydrogen peroxide as biocidal additive of colloidal silica slurry, pH is needed to be prepared 8.0 or less and content of metal impurity is needed to be prepared 1 ppm or less.

(10) As mentioned above, when hydrogen peroxide is added in alkaline colloidal silica described in the cited reference, decomposition of hydrogen peroxide occurs. Therefore, even if it is described that hydrogen peroxide is used as a biocidal additive of the colloidal silica slurry, it is difficult to reach or arrive at the present invention from the description of each cited reference.

Therefore, the present invention has inventive step and is nonobvious.

CONCLUSION

As the Federal Circuit observed in Orthopedic Equipment Co. v. United States, 702 F.2d 1005, 217 U.S.P.Q. 193 (Fed. Cir. 1983):

> The question of nonobviousness is a simple one to ask, but difficult to answer ... The difficulty which attaches to all honest attempts to answer this question can be attributed to the strong temptation to rely on hindsight while undertaking this evaluation. It is wrong to use the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit. Monday morning quarterbacking is quite improper when resolving the question of nonobviousness ...

Even though the initial claims in this important patent application were drawn to a new, useful and nonobvious invention, claims 10-12 have been canceled and claims 9 and 14 have been amended.

A Notice of Allowance is earnestly solicited.

If the Office is not fully persuaded as to the merits of Applicant's position, or if an

Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 538-3800 would be appreciated.

Very respectfully,

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